COMPLEMENTARY SET OF EXERCISES

ENGLISH II *(TELECOMUNIC.)*

Departament de
Projectes de l'Enginyeria

Secció Anglès

CONTENTS

Unit 1 - Modality and Hedging..... *1*

Unit 2 - Definitions..... *5*

Unit 3 - Describing function and purpose..... *14*

Unit 4 - Classification.....

Unit 5 - Causality and result..... *16*

Unit 6 - Conditions and conjectures..... *21*

Unit 7 - Compound nouns..... *23*

Unit 8 - Latin and phrasal verbs..... *26*

1.- MODALITY AND HEDGING

Modals

Modal auxiliaries are words which are combined with a verb to express mood. Modals can be used to express a change in mood in a present or past time.

A. The form for a non-past modal verb phrase is: modal auxiliary + base form of the verb.

Example: A programmer should plan the logic of a program before he writes it.

B. The negative form for a non-past modal verb phrase is: *modal auxiliary* + *not* + base form of the verb. The modals, except for *may*, may also be contracted.

Example: A programmer should not (shouldn't) write a program without planning it first.

C. Three of the modals have past forms, but do not necessarily refer to past time:

can–could will–would may–might

Example: Flowcharting is one method of program design that may be used.
Flowcharting is one method of program design that might be used.

The past of many modals is formed by using the modal perfect verb phrase: modal + *have* + past participle. This indicates that the action could have taken place, but did not.

Example: A program with many mistakes should have been reviewed before it was tested.

D. The negative of the modals have the following form: modal + *not* + base form of the verb. The negative modal form may also be contracted.

Example: A programmer should not (shouldn't) write a program without planning it first.

E. The modal auxiliaries that express necessity—*have to* and *must*—have the same meaning. The negatives of must and have to—*must not* and *do not have to*— do not have the same meaning. *Must not* means something is prohibited; *do not have to* means something is not necessary.

Example: A program must not be used before it is tested.
A program does not have to use all the data when it is tested.

F. The following summarizes the most common usage of the modal auxiliaries:

Ability:	can	Ability in past:	could
Possibility:	can	Possibility in past:	could
Impossibility:	could not		
Probability (slight):	may	might	could
Strong probability:	must		
Permission:	can	may (formal usage)	
Necessity:	must	have to	
Lack of necessity:	do not have to		
Prohibition:	must not	may not	can't
Recommendation (strong):	must		
Advisability:	should	ought to	
Future action:	will		

Skill Enhancement

A. Fill in the blanks with the correct form of the modal auxiliary. Refer to the reading if necessary. The first question has been done for you.

The third step in the program development cycle is coding the program. This is the actual writing of the program in a form the computer can (may/can) understand. Proper and accurate coding is very important and ____ (may/must) be done so that a program ____ (can/should) be easily understood or modified. Any computer language, like the ones discussed previously in this book, ____ (ought to/can) be used for coding the program. However, it is important to remember that some languages are better and more efficient for writing programs in particular fields, as is FORTRAN for math and science. Because the problem described here (e.g., calculating grades) is fairly simple, the programmer ____ (might/must) choose to write the program in a general purpose language such as BASIC.

After the program is written, it ____ (can't/should) be input into the computer. Once it is in the computer, a printed copy called a listing ____ (cannot/can) then be obtained. The listing ____ (must/can) help the programmer review the program for errors in input, typing, logic, etc. Whether or not a listing is used, reviewing small parts of a program at this point—before testing the entire program—____ (has to/may) prove to be very helpful in creating a successful program.

B. Fill in the blanks with the appropriate modal. This passage is not found in the reading.

In order to write a successful program, a programmer ____ (can/must) first plan the program. Planning a program ____(may/should) be difficult, but if the programmer follows the steps in the program development cycle, his or her job ____ (will/must) be much easier. All the different steps in the cycle ____ (ought to/could) be followed in order to write a good program. The programmer ____ (has to/could) first analyze the problem. He or she ____ (could/should) then design the logic of the program. To do this a flowchart ____ (may not/may) be drawn, or another method of program design ____ (must /might) be used. After developing the program logic, the programmer ____ (could/should) code the program. This is an important step and ____ (could/must) be done very carefully. Next the programmer ____ (ought to/might) test the program. Many errors ____ (can/must) be corrected at this time. Finally the programmer ____ (could/should) develop documentation to make the program easy to understand.

The 40,000-Mile Phone Call

1 In the summer of 1984, almost two billion television viewers were able to watch the Summer Olympics from Los Angeles, "live via satellite." While a telecommunicaton satellite beamed the Olympics around the world, most viewers watched the events without stopping to think about how this form of instant communication works, or how it may affect their lives now and in the future, in both positive and negative ways.

2. The advantages of telecommunication systems for the rapid and efficient transmission of information to and from the home and around the world have been described by communications experts. They see the development of these systems as a first step toward eliminating political and geographic boundaries by making every kind of human knowledge available to all. However, the possible disadvantages of this new technology have usually been ignored.

BACKGROUND INFORMATION: APPLICATIONS AND BENEFITS

3. At the beginning of the twentieth century, there were four basic means of transmitting and receiving information over long distances: print, photography, telegraph, and telephone. By the middle of the century, both radio and television had become established means of transmitting sounds and/or pictures. In 1964, the Olympic Games in Tokyo became the first program to be transmitted via satellite.

4. In order to transmit an event such as the Olympics via satellite, television signals are first changed into radio waves, which are then sent from a station on earth to an orbiting satellite. The satellite receives the radio waves, amplifies them, and sends them back to earth, where another station picks them up and changes them back into television signals. Because any form of sound or visual information can be converted into radio waves, satellites are capable of transmitting not only television broadcasts, but telephone calls and printed materials such as books and magazines.

5. The combination of satellites, which transmit information, computers, which store information, and television, which displays information, will transform every home into an education and entertainment center. In theory, every person will have access to an unlimited amount of information.

6. Another important use of telecommunication satellites was demonstrated in 1974 when the "Teacher in the Sky" satellite transmitted educational programs to classes in remote areas of the United States. In 1975, many people in India saw television for the first time as they watched programs about agriculture and health.

7 The satellite also demonstrated how it could help provide medical assistance to people living in isolated areas where transportation and radio communication is difficult. For example, a health worker in an isolated area was able to transmit pictures of a patient's wound to a doctor far away. He was then able to follow the doctor's instructions on how to care for the patient.

8 A different satellite was responsible for saving lives of people at sea. When the ship of famous French oceanographer Jacques Cousteau was damaged near Antarctica, a satellite was used to report the weather to him. This information made it possible for the ship to reach Argentina safely.

9. Teleconferencing is another service made possible by telecommunication satellites. With teleconferencing, people in different parts of the world are able to "meet" via two-way television. During a world crisis, the nations' leaders could get together quickly to discuss their differences.

10 The most common use of telecommunication satellites, however, has been for transmitting telephone calls. Most of them travel 40,000 miles to a satellite and then back to earth. Today, a satellite is capable of receiving and transmitting more than 18,000 telephone conversations simultaneously. By 1986, a single satellite will be able to transmit 33,000 conversations as well as several television channels—all at the same time.

RISKS AND SHORTCOMINGS

11. Telecommunication can make information from around the world available to use quickly and easily, but some people worry that this may be a risk to our privacy. If personal information is stored in computers, then it may be easily transmitted via satellite to anyone who can pay for the service.

12. Other futurists worry that telecommunication systems may isolate people from each other. They say that when people are able to shop from their homes, do their banking without leaving the house, watch any movie they want on their television, as well as get any information they need, then there will not be as much contact between people. This isolation may have a very destructive effect on social relations.

13. It is important to realize that the same technology that helps us may also harm us. We can prevent this from happening by carefully monitoring the new technology. As one communication experts says, "We must remember that technology alone is not the answer... It is the intelligent application of technology that will lead us to success."

From: The New Technologies. Readings for Learners of Englis
p·81-85.

UNDERSTANDING THE ARTICLE

GETTING THE MAIN IDEA

1. Which of these titles could be used for this article?
   a. Satellites in Your Future
   b. Satellites: The Enemy of Society
   c. Satellites: The Key to International Cooperation
   d. A Short History of Communication

2. Which statement would the author probably disagree with?
   a. Satellites are the most efficient means of communication we have today.
   b. Satellites perform many important functions.
   c. Satellites will make our lives better because we won't need to leave home.
   d. Governments should make laws about how satellites can be used.

CHECKING THE FACTS

1. In what year were the Olympic Games first transmitted by satellite?
2. Do people know more about the positive or negative effects of satellite transmission?
3. What were the four ways that information was transmitted eighty years ago?
4. Does a satellite receive television signals?
5. What kind of signal does a satellite receive?
6. What three things will make each home an education and entertainment center?
7. How much information will anyone be able to receive?
8. Name five other uses for satellites.
9. Do people actually meet at a teleconference?
10. How many miles does the average telephone call travel when it is sent by satellite?
11. Why do some people think that satellites may decrease our privacy?
12. Why do some futurists believe that satellites will decrease interpersonal communication?
13. What can we do to prevent the improper use of satellites?

Relative clauses

- RELATIVE CLAUSES give information about a noun or a pronoun. They have the following pattern:

NOUN/PRONOUN DESCRIBED	+ RELATIVE PRONOUN	i.e. who(m) which whose that	or Ø	+ (Subj.) + VERB + compl.

-Defining relative clauses: They identify or define the preceeding noun /pronoun.

e.g. This is the company **which** sells computer components.

-Non-defining relative clauses: They simply add a piece of information. The relative clause is separated from the rest of the sentence by commas.

e.g. The Victoria Line, **which was opened in 1969,** was London's first complete new tube line for 60 years.

DEFINING RELATIVE CLAUSES.

They take the following relative pronouns:

	PEOPLE	THINGS
PRONOUNS	THAT / WHO(M)	THAT / WHICH
	WHOSE	

ex: The man | that / who | invented the radio was intelligent.

ex: Telephone conversations | that / which | are sent by satellite are very common today.

ex: Hewlett Packard is a brand **whose** printers are very good.

ex: That is the student **whose** book was stolen yesterday.

With prepositions:

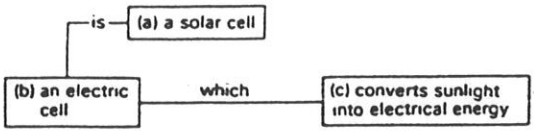
-People: for / with / to **WHOM**
-Things: on / through / in **WHICH**

UNIT 2.

DEFINITIONS

• *making definitions*

One use of defining relative clauses is to make definitions. Study this diagram:



1) Now make eight definitions using the information in this table. You must decide on the correct combinations of (a), (b) and (c).

(a)	(b)	(c)
a generator	a material	measures light
an insulator	an instrument	readily releases electrons
an alternating current	a current	flows first in one direction, then in the other
a direct current	a device	
a resistor		does not readily release electrons
a conductor		impedes the flow of current in a circuit
a light meter		
an ammeter		measures current
		converts mechanical energy into electrical energy
		flows in one direction only

2) Try to write your own definitions of these:

1. a voltmeter
2. an electric motor
3. a receiver
4. a transmitter
5. an electric cell

• *Defining and non-defining relative clauses.*

Study these two sentences:

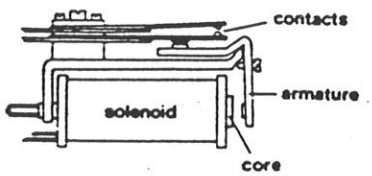
The cables were undamaged.
The cables were armoured.

We can link them in two ways using a relative clause:

1. The cables WHICH WERE ARMOURED were undamaged. *Defining*
2. The cables, WHICH WERE ARMOURED, were undamaged. *non-defining*

- Sentence 1 means that only the armoured cables were undamaged. Other cables, for example pvc coated cables, were damaged. The relative clause is a defining one. It defines the type of cable which was undamaged. It carries essential information.
- Sentence 2 means that all the cables were undamaged and all the cables were armoured. The relative clause is a non-defining one. It adds some extra information to the sentence but it is not essential. We can remove it from the sentence and the sentence still makes good sense. It is separated from the rest of the sentence by commas.

3) Use non-defining relative clauses to add extra information to this paragraph about a relay. This extra information is given below the paragraph.



Electric relays (1). . . . . utilize the magnetic effect of a current in a solenoid. One of the most common types (2). . . . . consists of a solenoid with a soft-iron core. When energized by a suitable dc current, the solenoid attracts an armature (3). . . . . The armature is pivoted in such a way that it pushes together or pulls apart a set of contacts (4). . . . . These contacts (5). . . . . control one or more circuits. Normally these circuits draw a much heavier current than the relay coil itself.

1. Electric relays are widely used in telecommunications.
2. The most common type of relay is known as the hinged armature relay.
3. The armature is also made of soft iron.
4. The sets of contacts are mounted on the body of the relay.
5. The contacts are often made of silver.

• *Relative clauses : clauses with prepositions*

Study these sentences:

1. The resistor has a value of 33 000 ohms.
2. The capacitor is connected across the resistor.

Note how they can be linked using a relative clause:

1+2. The resistor ACROSS WHICH THE CAPACITOR IS CONNECTED has a value of 33 000 ohms.

The repeated noun in sentence 2, *resistor*, has a preposition, *across*, before it. This preposition must be included in the relative clause. It is placed before the relative word, ***which.***

4) Now link these sentences. Make the second sentence in each pair a relative clause. State whether the clauses are defining or non-defining.
Explain any difference in meaning which may occur.

1. The range is 0–1000 volts.
   The meter can operate over the range.
2. A battery is a device.
   The device changes chemical energy into electrical energy.
3. Power supplies are used to drive dc motors.
   The power supplies use thyristor rectifiers.
4. The capacitor has a value of 27pF.
   The signal is passed through the capacitor.
5. The telephone is a device.
   The device uses the magnetic effect of a current.
6. The receiver can only be used with headphones.
   The headphones have a high impedance.
7. The plates are known as X and Y plates.
   The beam passes between the plates.
8. The rotor contains a commutator.
   The commutator acts as a switch.

• *Short relative clauses*

–We can join these sentences by using a relative clause.

1. The lines are arranged in two groups.
2. The lines carry the supply.

1+2. The lines WHICH CARRY THE SUPPLY are arranged in two groups.

We can shorten the relative clause like this:

The lines CARRYING THE SUPPLY are arranged in two groups.

–Note how these two sentences are joined by a relative clause.

3. The lines are suspended from insulators.
4. The insulators are made of porcelain.

3+4. The lines are suspended from insulators WHICH ARE MADE OF PORCELAIN.

Relative clauses like this with passive verbs can be shortened by omitting the relative word and the verb *to be*:

The lines are suspended from insulators MADE OF PORCELAIN.

5) Now link each group of sentences into one sentence. Use short relative clauses where possible. Number 2 cannot be shortened.

1. In Britain electrical energy is fed to the National Grid.
   The energy is generated in power stations.
2. The energy passes through a transformer.
   The transformer steps up the voltage to 132, 275, or 400 kV.
3. The transmission lines are usually arranged in groups of three overhead conductors.
   The lines carry the supply.
   The overhead conductors are suspended from porcelain insulators.
4. Energy from power stations may be fed to the Grid by underground cables.
   The power stations are located in built-up areas.
5. For voltages up to 400 kV cables are used.
   These cables contain oil under low pressure.

6) Make this paragraph shorter by reducing the relative clauses. Use all the methods of reduction you have learned in this unit.

The telephone is an instrument which enables us to transmit speech via wires. The body of the telephone contains an induction coil, capacitors, resistors, contacts, a regulator, which controls the sensitivity of the instrument, and a bell. The handset contains a microphone and a receiver which are enclosed by screwed caps at the ends of the handset. The bell contains a hammer which is operated by a solenoid. The hammer is set between two domes which are eccentrically mounted. The dial is mounted on the face of the telephone. It consists of a rotatable plate which has ten finger holes in it. A wheel, which has ten slots cut in its edge which match the finger holes, is fitted below the dial. When the plate is turned, the wheel causes spring contacts to open and close a number of times which correspond to the number dialled. This transmits pulses down the line causing selectors, which connect the calling line to the line which is called, to operate.

A) Read this text and complete Table 1 & 2.

Propagation of radio waves

Radio waves from a transmitting aerial can travel in one or more of three different ways.

Surface or ground wave This travels along the ground, following the curvature of the earth's surface. Its range is limited mainly by the extent to which energy is absorbed from it by the ground. Poor conductors, such as sand, absorb more strongly than water, and the higher the frequency the greater the absorption. The range is about 1500km at low frequencies (long waves).

Table 1

	Surface wave
Frequencies	
Travels	
Range	
Difficulties	

Sky wave It travels skywards and, if it is below a certain critical frequency (typically 30MHz), is returned to earth by the ionosphere. This consists of layers of air molecules stretching from about 80km above the earth to 500km. On striking the earth, the sky wave bounces back to the ionosphere where it is again gradually refracted and returned earthwards as if by 'reflection'. This continues until it is completely attenuated.

The critical frequency varies with the time of day and the seasons. Sky waves of high frequencies can travel thousands of kilometres but at VHF and above they usually pass through the ionosphere into outer space.

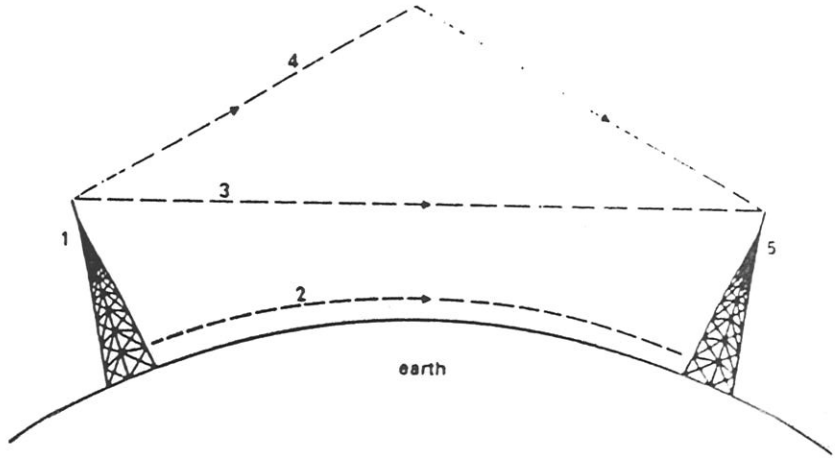
Space Wave For VHF, UHF, and microwave signals, only the space wave, giving line of sight transmission, is effective. A range of up to 150km is possible on earth if the transmitting aerial is on high ground and there are no intervening obstacles such as hills, buildings, or trees. Space waves are also used for satellite communications.

Table 2

	Sky wave	Space wave
Frequencies		
Travels		
Range		
Difficulties		

B) With the help of Tables 1 and 2, label the diagram using these labels:

a transmitting aerial
b receiving aerial
c sky wave
d space wave
e surface wave



C) *Now with the help of the information provided in Tables 1 & 2, write a formal definition of a surface wave, a sky wave and a space wave.*

Telecommunications

Communication, the exchange of ideas and information, is fundamental to human nature. Since time began, man has looked for ways of sending his messages over longer distances, using, for example, drums, arrows, smoke signals and flags. As civilization has grown, so has the need for fast long-distance communication in everyday life. Now we possess advanced technology to speed our messages around the world almost as fast as thought itself. This is the new science of telecommunications.

Communication is usually effected by the exchange of a series of signals or signs agreed by both sender and receiver. In telecommunications the information is converted from its original form, such as the human voice, to an electronic signal; the equipment which carries out this conversion is called a transducer. The electronic signal is transmitted through a suitable transmission path, to be converted back to its original form by a second transducer at the receiving end. In line communications the frequency of oscillation of an electric current or voltage serves as the carrier of information, whereas in radio systems the carrier wave consists of periodic oscillation in the electromagnetic field. The speed with which signals can be transmitted is of great importance. Electromagnetic energy travels at speeds up to that of light, depending on the medium through which it is travelling.

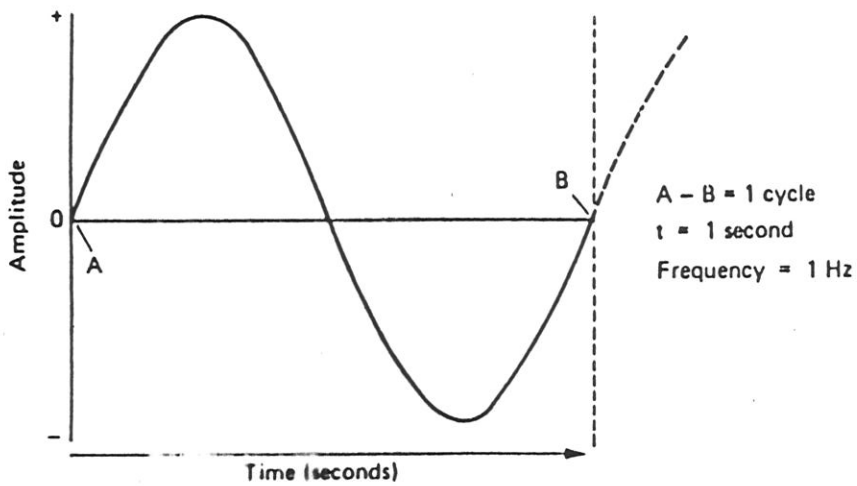


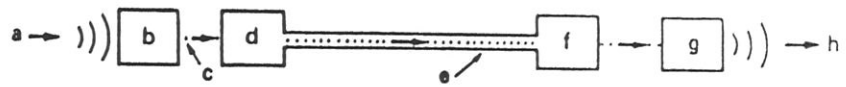
FIG. 1. A sinusoidal waveform.

One of the simplest waveforms is the sinusoidal waveform of an alternating current produced by the rotation of a wire loop in a magnetic field. The number of complete cycles in 1 second is the frequency in Hertz (Hz): 1 Hz = 1 c/s. 1000 Hz = 1 kilohertz (kHz); 1000 kHz = 1 megahertz (MHz); 1000 MHz = 1 gigahertz (GHz).

EXERCISES

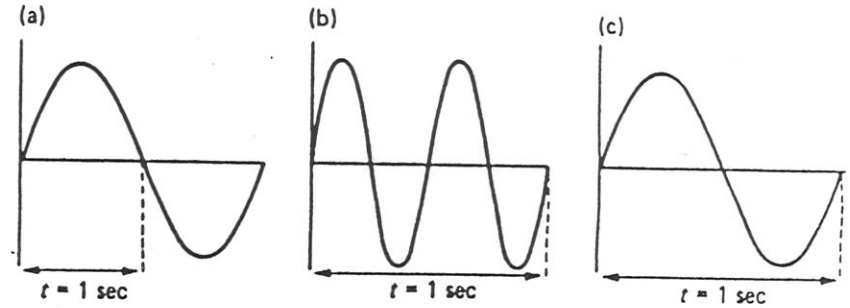
1.1 Choose the following:
(a) Which word means "the exchange of information"?
(b) Which word means "long distance communication"?
(c) Which word means "modern scientific equipment"?

1.2 Label the diagram:



ELECTRONIC SIGNAL TRANSDUCER RECEIVER TRANSMITTER PATH ORIGINAL SIGNAL TRANSMISSION PATH

1.3 Give the frequency of:



Computer communications 1

Reading

Read the following extract from a speech about 'Trends in Computer Communications'. As you read complete Figure 4c

The present status of telecommunications is a result of a long evolution through more than a hundred years. It is interesting to note that the old telegraph system used digital transmission. When, many years later, telephony was introduced, analogue transmission was used. Telex, on the other hand, worked with a digital technique while video transmission in principle uses analogue transmission. Data communication is digital and a transition is now taking place where all services, voice, text, data and picture—will be integrated in a basic digital network. This digital network will be an ideal carrier of data communications and will promote the growth of such communications.

The development of data communications depends, to a great extent, on the development of data processing. So far, all the signs indicate a trend towards remote data processing which means a greater usage of data communications services. Indeed, a 'marriage' of telecommunications and data processing will be the result. This 'marriage' will hopefully result in a number of useful products. Already a range of specialized services is foreseen—in particular in the text and picture communication field.

A number of new text services have been, or will be, introduced shortly:

Firstly, a lot of interest has been shown in **Teletex** which is already being introduced in some countries. Teletex is an international service enabling subscribers to exchange correspondence on an automatic memory to memory basis, via telecommunications networks. As a successor to telex, it will use specially adapted word processors and electronic typewriters and enable a 3-page A4 letter to be sent almost instantaneously from one end of the country to the other. In Britain, estimates vary of when teletex will be forthcoming, but meanwhile, Germany and Sweden already have systems in operation and teletex launches are planned in France, Spain, Belgium and Canada before long.

The **Telefacsimile** service is well established, though faster and more advanced systems (Group 4 types) will be introduced shortly. This service provides for the transmission and reproduction of still pictures and printed matter. Telefax has its biggest market in Japan where the complexity of Japanese script makes this an ideal medium of transmission.

Videotex, called viewdata in the UK, has passed through an experimental and testing stage and is now available in many countries. Videotex is a service enabling a subscriber to obtain information over the public switched telecoms network (PSTN) for presentation in alphanumeric and/or graphic form on a VDU—usually a specially adapted TV receiver. This service is marketed under different names in different countries. Prestel in the UK, Bildschirmtext in FRD and Telidon in Canada. Videotex subscribers may choose to have an additional service—**electronic mailbox** enabling them to send messages directly and instantaneously to one another. The UK viewdata system, which is an interactive service, should not be confused with **Teletext**, a one-way information service which TV companies broadcast. (In the UK two systems are available—Ceefax and Oracle.)

Technically it will be possible to integrate various types of telecommunications networks (private and public, data and telephony) to form an Integrated Services Digital Network (ISDN). In Germany the BIGFON experiment has recently been launched. BIGFON is a wide-band integrated services local communications system, offering the subscriber the complete spectrum of telecommunications services, including a new video telephone service as well as radio and TV broadcasts, all transmitted via optical fibre cables. (See Figure 4b.)

Despite this development towards ISDN, a number of specialized networks will have to live side by side for many years to come. From the customer's point of view, it is therefore essential that networks and services are compatible. It should be possible to use one and the same terminal for different services and to send traffic over different networks. The question is how can this be realized? Could an integrated network be developed? (See Figure 4a.)

Concept of a possible "intelligent" network

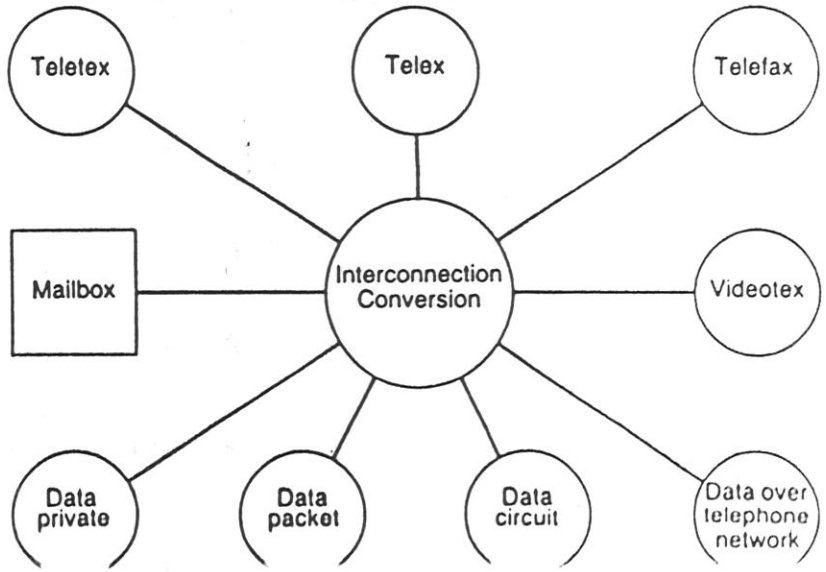


Fig 4a

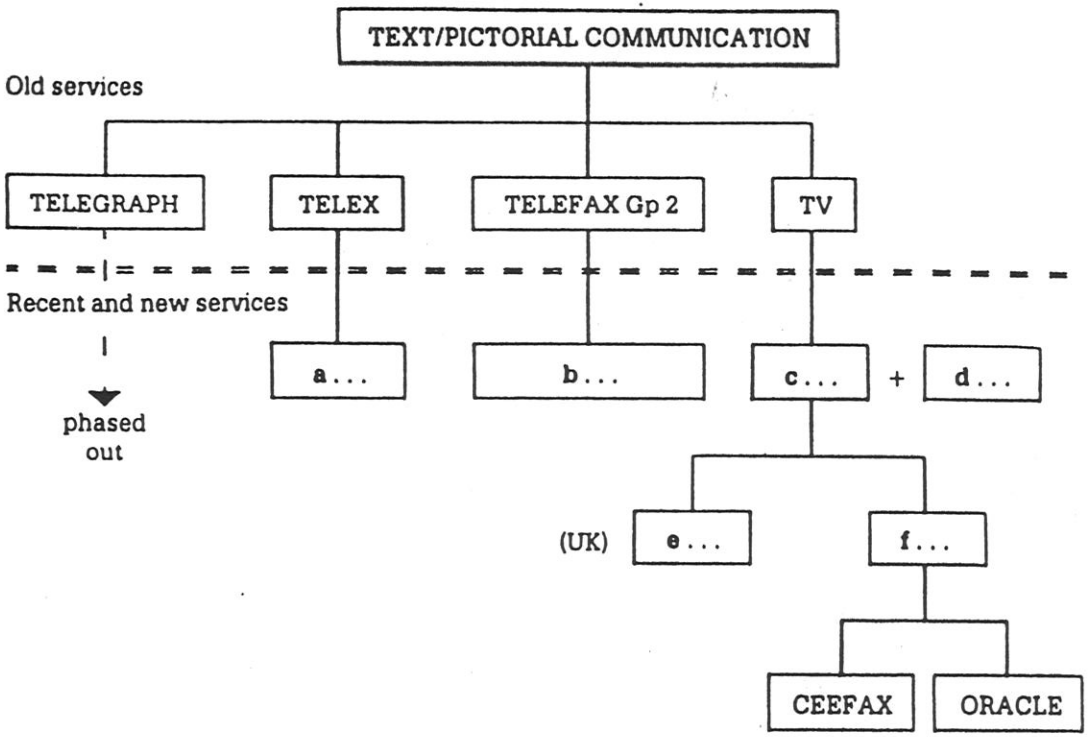


Fig 4c

Comprehension

Answer the following questions:

a Classify the following services under Digital (D) or Analogue (A) transmission:
telegraphy . . . telephony . . . telex . . .
video . . . data . . .

b What does 'remote data processing' mean?
i) data processing is carried out in one central place
ii) the processing of different types of data
iii) data processing is carried out in different geographical locations.

c What two features which distinguish teletex from telex are mentioned?
i) . . . ii) . . .

d Why is Japan such a big market for Telefax?

e What is the main difference between Viewdata and Teletext?

f Why is it necessary for networks and services to be compatible?

Shorten this summary of the technical reading passage by reducing the relative clauses where possible.

Transmission lines

The lines which connect telephones within a building are the simplest type of transmission line, which consists of parallel wires. Those which link telephones to a local exchange may be twisted pairs, although these are being replaced. Coaxial cable, which is formed from a copper core which is surrounded by a copper braid, is used to carry a large number of signals over long distances. The cables which provide connections between telephone exchanges are often coaxial. Waveguides, which are made of copper, are used to carry microwave signals between dish aerials and receivers. They are suitable for frequencies which are between 1GHz and 300GHz. Optical fibres, which are made from very pure silica fibre, are the form of transmission line which is most often used these days.

CIRCUIT ELEMENTS

Current moves from a point of high potential energy to one of low potential. It can only do so if there is a path for it to follow. This path is called an electric circuit. All circuits contain four elements: a source, a load, a transmission system and a control.

The source provides the electromotive force. This establishes the difference in potential which makes current flow possible. The source can be any device which supplies electrical energy. For example, it may be a generator or a battery.

The load converts the electrical energy from the source into some other form of energy. For instance, a lamp changes electrical energy into light and heat. The load can be any electrical device.

The transmission system conducts the current round the circuit. Any conductor can be part of a transmission system. Most systems consist of wires. It is often possible, however, for the metal frame of a unit to be one section of its transmission system. For example, the metal chassis of many electrical devices are used to conduct current. Similarly the body of a car is part of its electrical transmission system.

The control regulates the current flow in the circuit. It may control the current by limiting it, as does a rheostat, or by interrupting it, as does a switch.

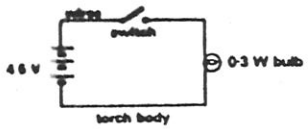


FIGURE 1

Study Figure 1. In this simple flashlight circuit, the source comprises three 1·5 V cells in series. The load is a 0·3 W bulb. Part of the transmission system is the metal body of the flashlight, and the control is a sliding switch.

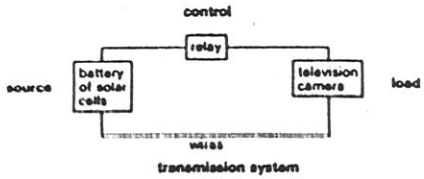


FIGURE 2

Compare Figure 2. The function of this circuit is to operate a television camera aboard a space satellite. Here the source is a battery of solar cells. A solar cell is an electric cell which converts sunlight into electrical energy. The load is the television camera. The transmission system is the connecting wires. The control is a relay actuated by transmissions from ground control. Although the function of this circuit is much more complex than that of the flashlight, it too consists of the four basic elements.

EXERCISE A *Rephrasing*

Rewrite the following sentences, replacing the words in italics with expressions from the passage which have a similar meaning.

1. A lamp *converts* electrical energy into light.
2. The generator *provides* the circuit with electromotive force.
3. The metal *frame* of the oscilloscope is part of its transmission system.
4. The rheostat *controls* the current flow in the circuit.
5. A battery of solar cells *supplies* power to the circuit.

EXERCISE B *Contextual reference*

What do the pronouns in italics in these sentences refer to?

1. Current moves from a point of high potential energy to *one* of low potential. (line 1)
   (a) current
   (b) energy
   (c) a point
2. For example, *it* may be a generator or a battery. (line 7)
   (a) the source
   (b) a device
   (c) electromotive force
3. It is often possible, however, for the metal frame of a unit to be one section of *its* transmission system. (line 13)
   (a) the metal frame's
   (b) the unit's
   (c) the circuit's

---

4. Although the function of this circuit is much more complex than that of the flashlight, *it* too consists of the four basic elements. (line 27)
   (a) this circuit
   (b) the function
   (c) the flashlight

EXERCISE C *Checking facts and ideas*

Decide if these statements are true or false. Quote from the passage to support your decisions.

1. A difference in potential is required before current can flow in a circuit.
2. A generator is a source of electromotive force.
3. Loads convert electrical energy into light and heat.
4. Transmission systems must consist of wires.
5. A rheostat may be used as a control.
6. The load in the flashlight circuit is a bulb.
7. The source in the satellite circuit is a solar cell.
8. The current flow in the satellite circuit is regulated by a relay.
9. The flashlight circuit differs basically from the satellite circuit.

Pulse Code Modulation

Pulse code modulation (p.c.m.) is a term used to describe several separate functions. In most practical systems, time division multiplexing of the signal samples (or their digital representations) from a number of channels is used to construct a multichannel configuration.

The corresponding receiving equipment must carry out the inverse functions of de-multiplexing the composite digital signal into the character signals representing each sample, decoding these signals and generating an analogue equivalent of the quantized sample and finally reconstructing an adequate representation of the original analogue signal for each voice channel.

All these fundamental processes have to be supplemented by ancillary functions such as those needed to provide a proper timing relationship and channel alignment between transmit and receive equipments.

To complete the system requirements it is necessary to add sufficient monitoring and alarm facilities to alert the maintenance engineer that a fault has occurred and also to ensure that faulty circuits are not accessed by traffic. Thus the concept of p.c.m. is that analogue signals, such as those generated by a telephone instrument in which the essential information is represented by the magnitude of the signal, are converted into digital signals in which the required information is represented by a sequence of binary digits. These digital signals can then be transmitted over appropriate digital transmission paths, combined and separated in digital multiplex equipments, switched in digital switching units and finally reach a remote p.c.m. receive terminal to be used as information to reconstruct the original analogue signal.

The question inevitably arises—"Why use p.c.m.?" There are many good reasons for doing so, not the least of which is that transmission quality is almost (although not quite) independent of distance.

Furthermore, once digital transmission paths have been introduced, these can be used as bearers for digital signals originating from many classes of source as well as for telephony, without the problems of cross-interference that frequently arise with analogue transmission using frequency division multiplex techniques.

(From: G. H. Bennett, *Pulse Code Modulation and Digital Transmission* © Marconi Instruments Ltd, 1976)

EXERCISES

10.1

1. Do you think this text comes from:
   (a) a magazine (b) a textbook (c) a technical manual.
2. The main concept of p.c.m. is:
   (a) time division multiplexing of signals
   (b) digital representation of analogue signals
   (c) telephone instrument signal magnitude

10.2 Give two reasons for using p.c.m.

10.3 Which word is closest in meaning to:

1. practical (line 2)
   (a) possible
   (b) almost
   (c) working
2. corresponding (line 6)
   (a) writing
   (b) matching
   (c) agreeing
3. inverse (line 6)
   (a) under
   (b) near
   (c) opposite
4. functions (line 7)
   (a) tasks
   (b) numbers
   (c) squares
5. composite (line 7)
   (a) separate
   (b) mixed
   (c) linear
6. monitoring (line 17)
   (a) carrying
   (b) maintaining
   (c) watching
7. alert (line 17)
   (a) tell
   (b) count
   (c) relate
8. occurred (line 18)
   (a) access
   (b) happened
   (c) agreed
9. magnitude (line 21)
   (a) magnetism
   (b) size
   (c) importance
10. converted (line 22)
    (a) checked
    (b) charged
    (c) changed

10.4

1. Complete these sentences:
   (a) _____ equipment separates the original samples from _____ _____ signal (or _____ _____ digital _____).
   (b) An _____ _____ is _____ for each voice _____.
   (c) Time division multiplexing is used to _____ _____ multichannel _____ _____ of signals from a number _____ _____.
2. Now put them in order to form a paragraph, as follows:

[x] . [y] . Finally, [z] .

10.5

1. Which of these is a binary sequence?
   (a) 222 (b) 10,000 (c) 110101
2. What is the binary representation of decimal 21?

5.- *CAUSALITY AND RESULT*

① Study the following pairs of statements. Identify the cause and the effect in each pair.

NOISE POLLUTION

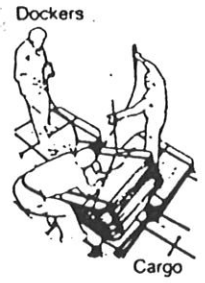
permanent damage to hearing	exposure to loud noises
some hearing defects of USA students	attending rock concerts
a sudden loud noise	involuntary muscle response
continuous traffic noises	mental disturbances
most harmful man-made noise	transport and industry
high noise levels in offices	an increased number of mistakes
sonic bangs	no physical damage to people
severe psychological disturbances	interruption to sleep
most cases of hearing damage	occupational exposure to noise

② Connect each pair of statements by using an appropriate expression of cause or effect. Begin each sentence with the information in the left-hand column. For example,

age	a reduction of hearing ability

Age causes a reduction of hearing ability.

③ Read these two cases showing the causes and effects of a given problem, and answer the questions below.



conventional methods

Case No. 1

The manager of a shipping company was interested in using large metal containers for the company's cargo instead of conventional methods of loading and unloading. He discovered that the use of containers was less expensive and quicker than conventional methods. More cargo could be sent at one time and delays on the way were shorter. The only major disadvantage (apart from the initial cost of the containers) was that not all ships could take them.[2] However, the manager believed that his company could find enough ships for their containers. His plan to use containers was adopted by the board of directors. Unfortunately, however, it was never put into practice.[3] The dockers heard about the plan and did not like it. The reason was that the containers would make about a quarter of the dockers redundant.[4] The plan was killed.[5]

it would make them redundant = it would make their jobs unnecessary ∴ they would lose their jobs

2 This is a disadvantage of what?

3 What was not put into practice?

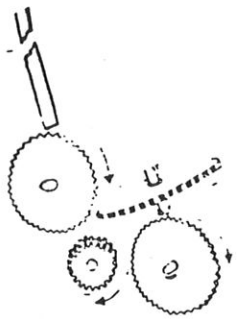
4 Why did they not like the plan?

5 What was the effect of the dockers' decision?

containers

5.II SENTENCE CONNECTORS USED TO EXPRESS A CAUSE.

Study the following passage and the pictures which accompany it. Identify: a the problem, b the solution which has been adopted.



At 3.45 p.m. on August 6th 1976 Big Ben stopped working.

The engineers who repaired the clock believe that the breakdown was the result of metal fatigue. Metals deteriorate owing to repeated stresses above a certain critical value.

Part of the clock mechanism fractured. As a result, the speed of the gear wheels increased from about 1½ revolutions per minute to 16 000 rpm. The resulting centrifugal force threw pieces of the clock mechanism in all directions. It also damaged the mechanism which drives the clock's hands.

The metal fatigue had never been noticed, as fatigue cracks are invisible to the naked eye. The engineers have now fitted a device that will prevent the accident from happening again. Any increase in speed will cause a brake to be applied to the gear wheel. The engineers are confident that Big Ben will remain accurate and reliable for another 200 years.

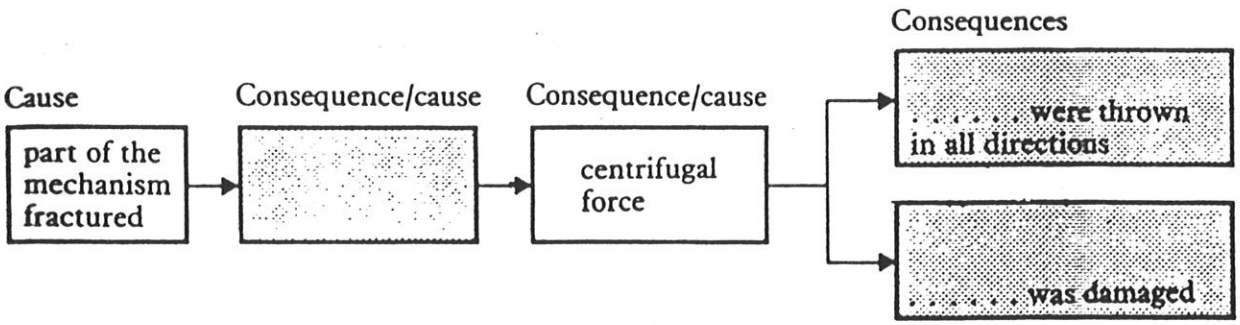
Now answer these questions:

1 According to the engineers, what caused the clock to break down?

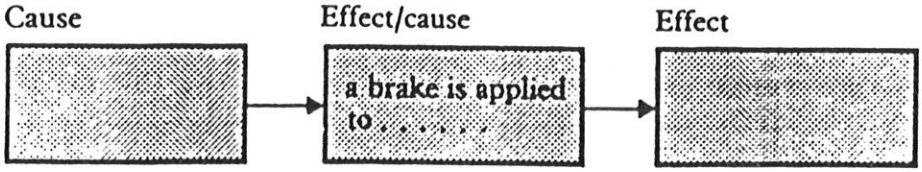
2 What general statement explains the occurrence of metal fatigue?

3 Why had the fatigue cracks never been noticed?

4 Complete the following diagram by studying the illustration of what happened:



5 Complete the following diagram about the device which has been fitted.



Terminals

[1] As central computers became faster and more powerful, it was possible to establish many remote display stations from which operators could all use the same computer to display information and enter data. Later, even the small machines were equipped with a fairly large **display screen** and **keyboard** oriented towards use by a person with limited training, rather than by a highly skilled computer operator.

[2] For many interactions with computers a permanent record is unnecessary; therefore, output that is scanned once and then thrown away produces a lot of wasted paper. To solve this problem **cathode ray tube (CRT)** terminals can be used. In addition to eliminating paper waste, these terminals are completely silent and frequently much faster than **hard-copy** terminals. Because of their speed and quietness, CRT terminals are very useful **interactive** devices for use in offices and in other areas. The electronic circuitry used in them is very much the same as that in the familiar TV (video) set.

[6] Besides screens, a wide variety of devices called **plotters** are used to produce permanent copies of graphic output. The first plotters developed used a pen that moved back and forth across the rotating drum to which paper was attached. These devices produced results which were both quite accurate and reasonably fast. Other plotters featuring a moving pen in two dimensions are relatively slow, because not only are they mechanical devices, but most can produce only one continuous line at a time. However, the modern **electrostatic plotter,** an extension of the previously mentioned electrostatic printer, can obtain slightly less artistic results in seconds because it doesn't depend on a moving pen. This is because it electronically generates patterns of dots in a line across the page to make up a picture.

Exercise 3

Refer back to paragraphs 2 and 6 of 'Terminals' (Unit 17) and complete the table below.

PARA	MARKER	CAUSE	EFFECT/RESULT
[2]	*therefore*		
		speed and quietness	
[6]			*results were accurate and fast*
	because		
		doesn't depend on moving pen	

UNIT 5 Shape Memory Alloys

1 Listening

TAPESCRIPT

Shape memory alloys have many applications, but before I give some examples, what exactly is a shape memory alloy?

Essentially it's a metal which _____ when cold and will remember its original shape when _____. The particular alloy we are using here in the lab is nickel titanium.

We can see one application here in a conventional piston. When the piston is cold, the SMA coil or spring contracts and _____ doesn't move. Heat causes it _____ and consequently the piston moves up. The advantage is that the device can work without any _____, just from the heat which is supplied by the engine itself.

Let's look at some other applications. Over here, we have a domestic coffee machine. We've fitted a valve controlled by an SMA actuator. When the coffee machine reaches a certain temperature, the SMA actuator opens the valve and _____ is dumped onto the coffee. Again the system works without any additional power — electrical or mechanical — just the heat of the steam given off _____ heats up.

One more application — this time for the motor industry. We're experimenting with a spring device which *expands* when it cools. This device will be fitted to the cooling fan. In cold weather, the spring expands and this makes the fan close down, and, _____ warm up the car. In warm weather, the spring contracts and _____ causes the fan to operate and, _____, helps to cool down the car. Again a system using no external or additional power source. Right, are there any questions?

ANSWERS TO LISTENING TASK

Application	*Cause*	*Primary effect*	*Secondary effect*	*Tertiary effect*
1. Piston	Piston cold	Coil contracts	Piston doesn't move	
	Piston hot	Coil expands	Piston moves up	
2. Coffee Machine	Reaches certain temperature	SMA actuator opens valve	Water is dumped onto coffee	
3. Cooling fan in car	Cold weather	Spring expands	The fan closes down	Car warms up
	Warm weather	Spring contracts	The fan operates	Car cools down

CONDITIONAL SENTENCES

Present Unreal

In a present unreal conditional sentence, the dependent clause is in the past tense and the main clause uses *would, should, could,* or *might.* The contracted forms *'d* and *n't* are often used.

If you *studied,* you *would pass* your exam.
If you *studied,* you *'d pass* your exam.
If I *knew* better, I *wouldn't make* these mistakes.

Supply the form of the verb in parentheses in order to form present unreal conditions. Use the full form and the contracted form.

A. 1. If I knew her well, I _____ (speak) to her.
(If I knew her well, I would speak to her. If I knew her well, I'd speak to her.)
2. If he attended class regularly, he _____ (make) good progress.
3. If we had the money, we _____ (take) a trip to South America.
4. If he went to bed earlier, he _____ not _____ (feel) so tired.
5. If he drove more carefully, he _____ (have) fewer accidents.
6. If John paid his debts, people _____ (respect) him more.
7. If I knew English better, I _____ (read) some English novels.
8. If he prepared his homework every night, he _____ (get) better grades.

B. 1. If I _____ (own) an automobile, I would take a trip to California.
2. If she _____ (work) harder, she would probably get a better salary.
3. If I _____ (know) how to drive, I would buy a car.
4. If Louis _____ (know) more grammar, he would make fewer mistakes.
5. If he _____ not _____ (waste) so much time in class, he would make better progress.

CONDITIONAL SENTENCES

Present Unreal

Dependent clauses of present unreal conditional sentences use the past tense forms of all verbs except *to be. To be* uses *were* in all persons in these clauses.

I were	we were
you were	you were
he were, she were, it were	they were

If I *were* you, I would study.
If he *were* here, he would answer your question.

Supply the form of the verb in parentheses to make present unreal conditions.

A. 1. If I _____ (be) you, I wouldn't mention it to her.
(If I were you, I wouldn't mention it to her.)
2. If today _____ (be) Saturday, I would not have to work.
3. If I _____ (be) in your position, I would think twice before doing that.
4. If today _____ (be) a holiday, we could go to the beach.
5. If the weather _____ (be) not so hot, I am sure she would feel better.
6. If Pete _____ (be) here, he would help us with this work.
7. If you _____ (be) a millionaire, how would you spend your time?

B. 1. If George were here with us, I _____ (feel) more comfortable.
2. If they were really poor, they _____ not (be) _____ able to live as they do.
3. If I were in Paris now, I _____ (go) to some of the summer concerts.
4. If Jill were here, she _____ (know) what to do.
5. If I were you, I _____ (tell) everyone the truth about the matter.
6. If I were a millionaire, I _____ (live) on the French Riviera.
7. If he were more ambitious, he _____ (try) to find a better job.

THE EFFECTS OF AN ELECTRIC CURRENT

The effects of an electric current are thermal, luminous, chemical and magnetic. When a current flows through a conductor it may heat the conductor. This heat is sometimes undesirable and has to be reduced. For this reason many electric motors and generators contain a fan. However, domestic appliances, such as electric cookers, and many industrial processes depend on the heating effect of an electric current.

The passage of a current may produce light. This can happen in a number of ways. The heat generated by the current may be so great that the conductor becomes incandescent. For example, the filament of a light bulb emits intense white light when heated by a current. Light is also produced when a current ionizes a gas. The colour of the light will vary according to the gas used. Mercury vapour lamps give a greenish-blue light.

An electric current can separate a chemical compound into its components. This is called electrolysis. Chlorine is generated by the electrolysis of salt water. Electrolysis can also be used to break down water into hydrogen and oxygen. Because pure water does not conduct well, sulphuric acid has to be added before the electrolysis takes place.

A current flowing through a conductor creates a magnetic field around it. This field has three applications. It can magnetize magnetic materials and attract them to the conductor. The electric relay works on this principle. If the magnetic field is cut by another conductor, an electromotive force will be induced in that conductor. For instance, the change in current flowing through the primary of a transformer will induce a current in the secondary. This principle is also used in generators. Thirdly, if a current-carrying conductor is placed in the magnetic field, a force will be exerted on it. This effect is utilized in the electric motor.

1.-"This" on line 7 refers to:
a) current b) light
c) passage d) the fact of producing light

2.- "vary" on line 11 has a synonym in:
a) increase b) decrease
c) change d) transform

3.- "separate...into" on line 13 is a synonym of:
a) divide into b) classify
b) result in d) lead to

4.- "break down" on line 15. Give a synonym from the text.

5.- "them" on line 20 refers to:
a) applications b) conductors
b) magnetic materials d) magnetic fields

6.- Complete these sentences with a suitable expression from the text.
a) An electromagnetic force will be induced in a conductor provided_____that conductor.

b) Unless_____in the magnetic field, a force will not be exerted on it.

STAGE 2 *Note-taking*

Now study the passage carefully and complete this framework of notes:

Effects of an electric current:
1. thermal
2. .....
3. .....
4. magnetic

1. heat can be
   (a) undesirable e.g. motor
   (b) ..... e.g. cooker
2. light
   (a) from incandescent conductor e.g. .....
   (b) from ..... e.g. vapour lamp
3. ..... = breakdown of chemical compound e.g. salt water into chlorine
4. current flowing in conductor → ..... round it. Magnetic field has 3 applications:
   (a) ..... e.g. relay
   (b) induce emf in another conductor e.g. .....
   (c) ..... e.g. motor

UNIT 6

CONDITIONS AND CONJECTURES.

A) Translate these sentences into English. Remember what you have learnt about conditional sentences and conditional expressions (6.II in your Workbook) and in previous units:

1.- Si la tensión de suministro no es normal, el circuito de alimentación se debería revisar.

2.- El fallo probablemente se deba a (que hay) un circuito abierto.

3.- En caso de que la corriente aumentara hasta un 170% más de lo normal, el fusible probablemente se fundiría.

4.- El timbre sonará siempre y cuando se pulse el interruptor y no haya problemas en el circuito.

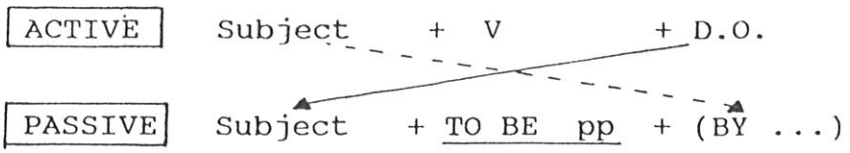
5.- Si ese sistema no hubiera dispuesto de un interruptor automático, podría haber habido un grave accidente en el laboratorio.

6.- El sistema de alarma dejará de funcionar en una bajada de tensión o en el caso de que un intruso desconecte la fuente de alimentación, a menos que haya una batería de reserva que evite que estos accidentes ocurran.

7.- Tuve que crear un programa nuevo que tuviera una mayor resolución, de lo contrario habría necesitado mucho más tiempo para acabar el Proyecto de Final de carrera.

7.- COMPOUND NOUNS

REVISION OF THE PASSIVE VOICE.



Usual mistake:

"Se utilizaron dos nuevas válvulas" *"Se habían utilizado motores antiguos"*

Two new valves were used. *Old engines had been used*

ACTIVE		PASSIVE
use	is used	
used	was used	
has used	has been used	
had used	had been used	
will use	will be used	
would use	would be used	
can use	can be used	
must	must be	

1.- *Now translate these sentences into the passive. Remember all you have learnt in previous units. (The examples concern Mechanics, Electronics and Electrical Engineering, Fluid Mechanics, Computers...)*

1.- *La energía solar se transmite desde el sol, a través del espacio hasta la tierra mediante radiacion electromagnetica. Despues se debe convertir en calor antes de que se pueda utilizar.*

2.- *El vapor es un gas cuya temperatura y presión es tal que está cerca de la fase líquida. Por lo tanto, el vaho se considera un vapor porque su estado normalmente no esta muy lejos del de el agua.*

3.- *El volumen de un gas o vapor se ve afectado por los cambios en la presion o en la temperatura o en ambos. Es necesario tener en cuenta los cambios en el volumen y la temperatura al tratar gases y vapores. De manera que la mecanica de fluidos y la termodinamica estan interrelacionadas.*

4.- *La refrigeración y la industria del aire acondicionado se caracterizan por un crecimiento constante.*

5.- *El alto precio de la energía desde los anos 70 ha sido un factor significativo a la hora de estimular las escuelas tecnicas para los ingenieros*

6.- El tamano de la cabeza de un cilindro no está determinado por el numero de cilindros, sino por factores como por ejemplo el coste total del motor el diseno del bloque del cilindro, el numero de cojinetes, etc.

7.- La historia de la evolución de los ordenadores está llena de nombres importantes. Al científico frances Blaise Pascal se le conoce como el inventor de la primera maquina calculadora en 1642. Su maquina tenía una estructura mecanica.

8.- A este modelo mecánico le siguió en 1822 el de Charles Babbage, de la Universidad de Cambridge, que produjo un ordenador digital al que llamo motor analítico.

9.- Howard Allen de la Universidad de Harvard combinó los procesos mecanicos de Babagge con las tecnicas de Hollerith para desarrollar un ordenador electromecanico. Esta maquina era capaz de multiplicar y dividir mucho mas rapidamente. Sin embargo, su velocidad y su capacidad eran limitadas.

10.- El primer ordenador totalment electrónico se desarrolló en la Universidad de Pennsylvania.

11.- Si una corriente es inducida por un campo magnético en un anillo de material superconductor, continuara circulando cuando se elimine el campo magnetico.

12.- Se puede utilizar un gran número de instrumentos para medir el voltage. El contador electrostatico es el intrumento mas simple para voltages altos. Responde a ambas corrientes ac y dc.

13.- El teléfono es un instrumento que nos permite transmitir la voz a traves del cable.

14.- Si dos cristales de un material semiconductor, uno del tipo p y uno del tipo n se unen, se forma un empalme pn. Este empalme se puede utilizar como un rectificador y se le conoce como diodo de empalme pn.

15.- Un motor que convierte energía calorífica en trabajo mecánico se llama motor termico. Para controlar la entrada de la mezcla y el escape de los gases, se necesitan valvulas, una valvula de entrada y una de de salida.

Modulation

The processing of a signal to make it suitable for sending over a transmission medium is called *modulation*. Reasons for using modulation are:

(a) Frequency translating (e.g. when an audio-frequency baseband signal modulates a radio-frequency carrier).
(b) Improving signal/noise ratio by increasing the bandwidth (e.g. using frequency modulation).
(c) Multiplexing.

The simplest form of modulation is amplitude modulation (a.m.) of a sinusoidal carrier. If the modulating signal consists of a band of frequencies the modulated signal consists of two *sidebands*, each occupying the same bandwidth as the baseband signal. In the *upper sideband*, the highest frequency corresponds to the highest frequency in the baseband; this is therefore known as an *erect sideband*. In the *lower sideband*, the highest frequency corresponds to the lowest frequency in the baseband; this is known as an *inverted sideband*. Simple amplitude modulation makes inefficient use of the transmitted power, as information is transmitted only by the sidebands but the majority of the power is contained in the carrier. However, a.m. permits the use of a relatively simple receiver using an envelope demodulator. It is therefore used for services, such as broadcasting and mobile radio, where this is an important advantage.

In frequency modulation (f.m.) the amplitude of the signal conveys no information. Thus, amplitude variations due to fading have no effect on the output signal level. Amplitude variations caused by noise also have no effect.

Because of its good signal/noise ratio properties, f.m. is used for radio circuits whenever sufficient bandwidth can be provided. This is not possible for telephony in the more congested parts of the radio-frequency spectrum (v.h.f. and lower frequencies), but it is standard practice at u.h.f. and s.h.f. For telegraph signals, because of their narrow baseband, it is possible to use f.m. in the h.f. band.

In phase modulation (p.m.), the frequency deviation (βf_m) is proportional to the frequency of the modulating signal as well as its amplitude. Consequently, for signals (such as speech) that have the major proportion of their energy at the lower end of the baseband, p.m. makes inefficient use of transmission-path bandwidth in comparison with f.m. Moreover, to demodulate a p.m. signal, the receiver must compare the phase of the incoming carrier with that of a locally-generated reference waveform which must be extremely stable. F.m. is therefore preferred to p.m. for the transmission of analogue signals.

(From: J. E. Flood (ed.), *Telecommunication Networks*, 1975. Published by Peter Peregrimus Ltd on behalf of the Institution of Electrical Engineers)

EXERCISES

9.1

1. How many forms of modulation are described?
   (a) one (b) two (c) three (d) four
2. How many reasons for using modulation are listed?
   (a) one (b) two (c) three (d) four

9.2

1. What is modulation?
2. Which is the simplest form of modulation?
3. What is the main disadvantage of amplitude modulation?
4. What is the main advantage of a.m.?
5. For what is a.m. mainly used?
6. What is the main advantage of frequency modulation?
7. In which parts of the frequency spectrum is f.m. mainly used?
8. At what frequencies is f.m. unsuitable?
9. For what type of signals is phase modulation unsuitable?
10. Which type of modulation is best for analogue transmissions?

9.3

A	B
consists	by
corresponds	as
known	of
suitable	for
caused	to

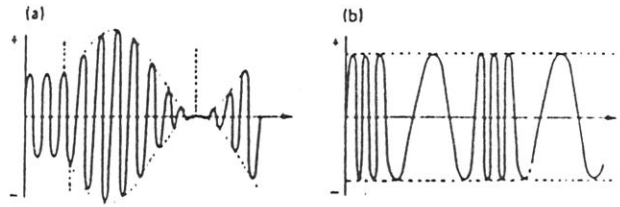
Complete the following sentences using one word from column A and one from column B.

1. Amplitude variations can be _____ _____ noise.
2. A modulating signal _____ _____ a band of frequencies.
3. F.M. is _____ _____ transmitting analogue signals.
4. Amplitude modulation of a sinusoidal carrier is _____ _____ a.m.
5. The highest frequency in the sideband _____ _____ a frequency in the baseband.

9.4 Give the full meanings of these abbreviations:

1. e.g.
2. a.m.
3. /
4. f.m.
5. v.h.f.
6. u.h.f.
7. s.h.f.
8. h.f.
9. p.m.
10. βf_m

9.5 Which types of modulation are illustrated?



8.- LATIN AND PHRASAL VERBS

• PHRASAL VERBS

> **Remember**
> an really started *to take off*
> it is possible *to get by*
> it is easy *to set up*

You may have a dictionary of phrasal verbs in your library. Try to spend some time looking at it.

to get by means "to barely or merely cope/do the minimum"
to set up means "to put in place or install"

① In this exercise you have to complete the sentences using a suitable phrasal verb from the list given. Use the correct form of the verb each time:

put in, get out of, set up, get by, take off, turn on, turn out, speak up, close down, get on with, knock out, consist of, break down

1. I couldn't really hear that lecture very well. I do wish Dr Brown would . . . . . a bit.
2. We had a very difficult time yesterday. The computer . . . . . three times so we couldn't finish our work.
3. I haven't seen you for ages. How are you . . . . . your course?
4. If I were you I would . . . . . a design with CAD (Computer-Aided Design) and then work on it more thoroughly at home.
5. It's possible to buy a complete package . . . . . database, spreadsheet and an elementary word processor.
6. I didn't have any problems once the program was running but I did find it difficult . . . . . .
7. This course is good but very time-consuming. You will need . . . . . many hours of practice.
8. Some students in my group never come to practicals. They think they can . . . . . with just attending lectures.
9. The college is in serious financial difficulties. They are considering . . . . . the computer centre because it's so expensive.
10. Computer science is a very useful course of study but how much you . . . . . it depends on how much work you are prepared to do.

PHRASAL VERBS

Here are some more phrasal verbs

blow up, go on, pick up, wash away, force out, find out, send up, pass in, turn into.

② *Rewrite these sentences, using the correct form of a verb from the list above to replace the words in italics*

a) Oxygen can be *converted* to liquid under pressure.
b) He *put air into* the tyres of his car before he drove away.
c) The first artificial satellite was *put into space* in 1957.
d) The house was *carried away by the force of the water* in the flood.
e) He can *receive* BBC transmissions on his radio.
f) If the rain *continues*, there will be floods.
g) Light *enters* through the lens.
h) Faraday *discovered* how to generate electricity.
i) Pressure *makes* the smoke *leave* through the exhaust pipe.

Nominalized forms

- Nominalized forms are nouns derived from phrasal verbs. Some phrasal verbs have a nominalized form that is in wide use, such as a **breakdown**, a **hold-up**. Many do not have a nominalized form.

'or more information on nominalized forms, see *Oxford Dictionary of Current Idiomatic English*, Volume 1.

reakdown mechanical failure (engine of vehicle, etc.) *Jack's car had another breakdown on the way to work. He didn't arrive until eleven o'clock.* (EI 107)

reak-in entry into a building by force (by thief, etc.) *There was a break-in at the video shop last night. A lot of equipment was stolen.*

heck-up thorough examination (usually medical). *You should go to your dentist for regular check-ups.*

all-off decrease (numbers), deterioration (quality). *No one liked the new lecturer, so there was a gradual fall-off in attendance at his lectures.*

hold-up delay, stoppage. *There's been an accident on the motorway, so there's a big hold-up.* (EI 127)

mix-up mistake, muddle, misunderstanding. *There must be a mix-up with the dates. Mr Jones is supposed to come tomorrow, not today.*

outlay expenditure, amount of money spent. *The outlay for the computer software was lower than we had expected.*

run-through quick examination, discussion or rehearsal. *Do you need to give your speech another run-through or do you already know it by heart?*

upkeep (cost of) keeping something in good condition or repair. *It may be wonderful to own a big, old house, but think of the upkeep!*

Exercise 1

Replace the words or phrases in *italics* with a nominalized form of a phrasal verb.

Where are the finished copies of the contract? What's the reason for the *delay*?
hold-up

1 Could we have a *quick discussion* of the final travel arrangements? A few things have been changed.
2 When did you last see your doctor for a *medical examination*?
3 Please make sure that the names on the list are correct this time. We don't want any more *mistakes*.
4 There has been a *decrease* in the number of hotel bookings this year.
5 How big was your initial *expenditure* for the laboratory equipment?
6 You may have enough money to buy a house with a large garden, but can you afford the *cost of maintaining it*?

Exercise 2

Complete the sentences with the correct nominalized form of a phrasal verb.

The ____ in profits indicates that something is wrong with the company's advertising policy.
fall-off

1 Our dentist says that children should go for regular ____ twice a year.
2 There was an awful ____ with the seating arrangements at the conference. Everyone was sitting in the wrong place!
3 There's obviously a ____ with my visa application. It should have arrived by now.
4 Simon had another ____ – on the motorway, unfortunately. He shouldn't have bought that old car.
5 I've given the figures a quick ____. I think they're correct.
6 There have been three ____ into supermarkets this week, all in the same area.